

### REMARKS

Claims 1, 2, 4 and 9 have been amended. Claim 14 has been cancelled without prejudice. New claims 22-31 have been added. The amended independent process claim 1 has been formulated in order to clarify a process. It is supported by former claim 1 and in Examples 2 and 3, for example. The amended claim 2 has been worded to correspond with the wording of the amended claim 1. The amended claim 4 has been modified to correct a grammatical error. The amended independent composition claim 9 has been formulated to clarify a composition. It is supported by former claim 9 and in Examples 1, 2 and 3, for instance. New claims 22, 24 and 26-30 specify preferred steps in the process and are supported by Examples 1, 2 and/or 3 and throughout the specification. New claims 23 and 25 are supported in Table 9, for example. New claim 31 is supported, for example in former claim 1. Therefore, no new matter has been introduced by these amendments. The following addresses the substance of the Office Action.

#### Non-obviousness

The Examiner has rejected Claims 1-10 and 14-21 under 35 USC §103(a) as being allegedly unpatentable over Sih et al. (USP 6,316,645) in view of Lee (USP 6,664,405), Tanino et al. (USP 4,499,010) and Shirai et al. (JP 20000336029 A). Specifically, the Examiner stated that it would have been obvious to a person having ordinary skill in the art, at the time the invention was made, to modify Lee's teaching by using the known compounds and processes to make the applicants' composition, with a reasonable expectation of success. With regard to Claim 14, the Examiner, stated that it would have been obvious to a person having ordinary skill in the art, at the time the invention was made, to modify the Tanino et al. teachings of a conductive paint to make the applicant's varnish, with a reasonable expectation of success. With regard to claims 15 and 17-21, the Examiner further stated that it would have been obvious to a person with an ordinary skill in the art, at the time the invention was made, to apply the Shirai et al teachings, because Shirai teaches "breast cancer inhibiting agent contains a conjugated linolenic acids, which comprises of 9,11,13-octadecatrienoic acid, 10,12,14-octadecatrienoic acid, their mixture etc". Applicants respectfully disagree.

The Examiner states that a difference between former claim 1 and Sih et al. is that *"the instant claims composition preparation includes water, whereas Sih et al. is silent on the use of water in the process"*. The Examiner then states that it would have been obvious to modify Sih et

al. with Lee stating that Lee "*teaches a method for isolating high purified unsaturated fatty acids from vegetable oils and process includes a step of adding water and then recovering the unsaturated fatty acids.*" The Applicant has modified the independent process claim 1 in order to better distinguish the process over the cited references. Instant claim 1 defines a process for preparing a composition comprising a mixture of linolenic acids of 9cis,13trans,15cis-octadecatrienoic acid and 9cis,11trans,15cis-octadecatrienoic acid, which includes the steps of:

providing a *solvent of water*;

blending with the solvent in the presence of a base, one or a mixture of vegetable oils having various concentrations of linolenic acid or partial glycerides of such oils or partially purified and/or concentrated isomers, to produce a reaction mixture; and  
recovering from the reaction mixture the composition comprising the mixture of linolenic acids.

Sih et al. does not suggest providing a *solvent of water* for carrying out the reaction. In fact, a person skilled in the art would not use a solvent of water in the reaction of Sih et al. as this would be both dangerous and unproductive. Lee does not teach that water may be used as a *solvent* for the preparation of the composition defined in the claim. In fact, in column 4 of Lee, the addition of water is performed in step (4) to remove any trace of residual urea and methanol; in step (7) in combination with hexane to cause the phase separation of urea and concentrated linoleic acid; and in step (8) for washing the concentrated linoleic acid or oleic acid. In addition, Lee teaches away from using a solvent of water since in step (1), methanol is used to dissolve the urea and in step (9), an organic solvent is used to dissolve the unsaturated fatty acid obtained in the previous step. In fact, a person skilled in the art would not use a solvent of water in the urea crystallisation of Lee since urea is too soluble in water for the reaction to function.

Thus, Sih et al. cannot be modified by Lee to motivate a person skilled in the art to use a *solvent of water* in which the vegetable oils or the like are blended in the presence of a base, to produce the mixture of 9c,13t,15c- and 9c,11tr,15c-octadecatrienoic acids.

The solvent of water also presents a number of advantages, in terms of providing a reaction medium and for subsequently recovering the linolenic acid isomers. For instance, the solvent of water enables the production of the particular 9c,13t,15c- and 9c,11tr,15c-octadecatrienoic acid isomers, providing the right conditions in the presence of the base.

In addition, when recovering the composition comprising the acid isomers from the reaction mixture, the separation of water solvent offers advantages over many other solvents that have higher boiling points, higher miscibilities with the composition or closer densities with the composition. In addition, the solvent of water offers safety advantages over many other types of solvents in terms of toxicity and operating conditions. In addition, water is a readily available, environmental, and cost-effective solvent.

In summary, Sih et al. cannot be modified with Lee to arrive at providing a *solvent of water* in the preparation of the composition including 9c,13t,15c- and 9c,11tr,15c-octadecatrienoic acids.

Instant claim 1 and dependant claims 2-8 and 22-31 are therefore non-obvious over the cited references.

Claim 14 has been cancelled without prejudice, therefore its rejection is now moot.

The Examiner rejects claims 9 and 10 that are directed to a composition comprising a mixture of linolenic acids of 9c,13t,15c- and 9c,11tr,15c-octadecatrienoic acids in a ratio of 1:1 and concentration of 30 to 90 % by weight.

The Examiner rejects claim 9 for obviousness in view of Sih et al. stating on page 3 of the Office Action that "*it is common practice in the art to make desirable ratio of the known compounds in a composition and these are optimizable parameters, and hence are not patentable*".

To better distinguish the composition over the cited references, claim 9 has been amended so that the composition is prepared by:

providing a solvent of water or polyol;

blending with the solvent in the presence of a strong base, one or a mixture of vegetable oils having various concentrations of linolenic acid or partial glycerides of such oils or partially purified and/or concentrated isomers, to produce a reaction mixture at a temperature of 160°C to 200°C; and

recovering from the reaction mixture the composition comprising the mixture of linolenic acids.

Instant claim 9 includes particular ratio and concentrations of the 9c,13t,15c- and 9c,11t,15c-octadecatrienoic acids as well as the feature that the composition is produced using certain process steps.

The process steps enumerated in instant claim 9 use *thermodynamic control* to enable the preparation of the desired ratio and concentrations of the acid isomers. In particular, instant claim 9 specifies using a *strong base and temperatures in the range of 160°C to 200°C*.

In stark contrast, Sih et al. uses kinetic control of the reaction using a *super-strong base* at relatively low temperatures.

It is well known that thermodynamic or kinetic reaction control have an effect on the composition in a reaction product when competing reactions lead to different products under different reaction conditions. In kinetic reaction control, the reaction favours the product with the lowest activation energy and goes forth regardless of relative product stabilities. Kinetic control is favoured with mild and low temperature conditions. In thermodynamic control, the product that is more thermodynamically stable is favored. Thermodynamic reaction control takes place with more vigorous reaction conditions or when the reaction is allowed to continue over a long time to give a slow reaction time to reach equilibrium.

Sih et al. teach a kinetic reaction. For instance, Sih et al. state that their method “is carried out under relatively mild conditions compared to the refluxing conditions of the currently used alkaline isomerization” (col. 3, ll. 5-7) and that their “process steps are carried out at room temperature and atmospheric pressure” (col. 4, ll. 16-17). As the Examiner acknowledges, Sih et al.’s disclosure does not specify the ratio or concentrations of the 9c,13t,15c- and 9c,11t,15c-octadecatrienoic acids. For instance, Fig. 2 of Sih et al. is a mere reaction schematic showing reaction products when 9c,12t,15c acid is reacted with a super-base at low temperature.

In addition, Examples 7 and 9 of Sih et al. read together to suggest that their reaction products do not have a reliable ratio or concentrations. Examples 7 and 9 seem to follow identical procedures, Example 9 having simply half quantities of Example 7. Example 7 yields mixtures of 10t-12c-14t conjugated diene methyl ester and 9c,12c,14t; 10t,12c,15c; 9c,13t,15c; and 9c,11t,15c isomers (col. 8, ll.21-25). However, Example 9 “yielded 10t,12c,14t octadecatrienoic acid” (col. 8, ll. 55-56) with no mention of other isomers.

Sih et al. obtain 9c,12c,14t and 10t,12c,15c isomers as desired intermediates that are then converted into the desired 10t-12c-14t isomer (see Fig 3 for instance). Sih et al. indeed teach away from a predictable ratio and concentrations of the 9c,13t,15c and 9c,11t,15c acid isomers.

In contrast, instant claim 9 defines a composition prepared by process steps to obtain a desired ratio and concentrations of 9c,13t,15c and 9c,11t,15c acid isomers. In addition, the composition having such desired ratio and concentrations of 9c,13t,15c and 9c,11t,15c acid isomers, has been shown to induce apoptosis of mammalian solid neoplastic cancer cells.

In summary, Sih et al. cannot be modified by "*common practice in the art*" to arrive at the composition having the desired ratio of 1:1 w/w and concentrations between 30% and 90%, and being prepared by certain process steps enabling thermodynamic control, as defined in instant claim 9.

Thus, instant claim 9 and dependant claim 10 are non-obvious with respect to Sih et al. and the other cited references.

The Examiner also rejected claims 15 and 17 to 21 as being obvious with respect to Shirai et al. The Applicant has obtained a translation of Shirai et al. which is now submitted herewith for the Examiner's perusal.

The Applicant notes the Examiner's allegations that "*It would have been obvious to a person of ordinary skill in the art, at the time of present invention was made, to apply the Shirai et al teachings. One would have been motivated to do this because Shirai et al. teaches 'breast cancer inhibiting agent contains a conjugated linolenic acids, which comprises of 9,11,13-octadecatrienoic acid, 10,12,14-octadecatrienoic acid, their mixture etc.'*" The Examiner also states that "*the difference between the instant claims and the Shirai et al is that the reference silent (according to the abstract) on using the cancer cell lines, whereas instant claims are specific to breast cancer cell lines.*"

In this regard, the Applicant notes that instant claim 15 also differs from Shirai et al. in being directed to a different composition. Claim 15 refers to the composition defined in instant claim 9, which includes a mixture of 9c,13t,15c- and 9c,11t,15c-octadecatrienoic acids having a ratio of 1:1 w/w, wherein the concentration of the mixture is between 30% and 90%.

Thus, instant claim 15 has this significant difference from Shirai et al. which the Examiner has not recognized.

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The Applicant further notes that. Shirai et al. used triconjugated 9,11,13-octadecatrienoic acid, 10,12,14-octadecatrienoic acid in rats. Shirai et al. provide no suggestion to modify the composition to use other acids or isomers, including a mixture of 9c,13t,15c- and 9c,11tr,15c-octadecatrienoic acids having a ratio of 1:1 and concentrations between 30% and 90%, in a method of inducing apoptosis of mammalian solid neoplastic cancer cells with the specific composition, as claimed in claim 15.

Thus, claim 15 and dependant claims 17-21 are non-obvious and consequently patentable over the cited reference.

### **Double patenting**

The Examiner has provisionally rejected Claims 1-18 on the grounds of non-statutory obviousness-type double patenting as being unpatentable over the claims of co-pending US Application No. 10/523,863. In view of the Applicant's decision not pursue the co-pending application No. 10/523,863, this rejection is moot

### No Disclaimers or Disavowals

Although the present communication may include alterations to the application or claims, or characterizations of claim scope or referenced art, the Applicants are not conceding in this application that previously pending claims are not patentable over the cited references. Rather, any alterations or characterizations are being made to facilitate expeditious prosecution of this application. The Applicants reserve the right to pursue at a later date any previously pending or other broader or narrower claims that capture any subject matter supported by the present disclosure, including subject matter found to be specifically disclaimed herein or by any prior prosecution. Accordingly, reviewers of this or any parent, child or related prosecution history shall not reasonably infer that the Applicants have made any disclaimers or disavowals of any subject matter supported by the present application.

### **CONCLUSION**

Applicants have endeavored to address all of the Examiner's concerns as expressed in the outstanding Office Action. Accordingly, amendments to the claims, the reasons therefor, and arguments in support of the patentability of the pending claim set are presented above. Any claim amendments which are not specifically discussed in the above remarks are made in order to

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improve the clarity of claim language, to correct grammatical mistakes or ambiguities, and to otherwise improve the capacity of the claims to particularly and distinctly point out the invention to those of skill in the art. In light of the above amendments and remarks, reconsideration and withdrawal of the outstanding rejections is specifically requested. If the Examiner finds any remaining impediment to the prompt allowance of these claims that could be clarified with a telephone conference, the Examiner is respectfully requested to initiate the same with the undersigned.

Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Respectfully submitted,

KNOBBE, MARTENS, OLSON & BEAR, LLP

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By: 

Marina L. Gordey  
Registration No. 52,950  
Agent of Record  
Customer No. 20,995  
(310) 551-3450

AMhND

5063257  
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